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Guide Specifications Instructions:
Edit these specifications to tailor to Project, closely coordinating with City-assigned Project Manager. Insert Project Name and Number in headers. Insert Revision Date and Design Consultant's Firm Name, which edited the Section, in footers. Remove all instructions, this cover page and any Notes to Specifier at the end of this Section prior to publishing. Do not change the base date of this Section in the footer.

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Section 02105

CHEMICAL SAMPLING AND ANALYSIS

PART 1 G E N E R A L

1.01 SECTION INCLUDES

A. Preparatory work related to excavation in a Potentially Petroleum Contaminated Area (PPCA).

B. Sampling and analysis of site material.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices

1. Preparatory work is paid on a lump sum basis. Item includes hiring environmental consultants, preparing Environmental Health and Safety Plan, preparing Environmental Work Plan, training personnel, and obtaining permits and additional insurance.

2. Underground Utility Construction in PPCA.

a. Underground utility construction and appurtenances in areas identified within PPCA limits is on a linear foot basis, each basis, or lump sum basis, as shown in Document 00410 – Bid Form.

b. Payment includes compensation for labor, equipment, and supervision for mobilization, environmental monitoring and field screening, handling, sampling, and testing of contaminated soil and groundwater. Contaminated soil may be Category I or II. Contaminated groundwater will be that encountered during excavation for underground utilities and flowing at a rate not greater than 20 gallons per minute. Included in this pay item is incremental cost for upgraded piping, gaskets, and appurtenant materials.

c. Limits of measurement under this section are noted on Drawings as ‘Begin PPCA Excavation’ and ‘End PPCA Excavation’ and other areas determined by Project Manager during the course of the work.

d. Payment will be made upon receipt of field test reports from approved analytical laboratory.

3. A force account for Extra Work for PPCA Handling will be used to compensate for time and materials required for additional work associated with PPCA when directed by Project Manager to perform such work and for which there is no bid item. Authorization and compensation for this work will be in accordance with Document 00700 - General Conditions.

4. Refer to Section 01270 - Measurement and Payment for unit price procedures.

B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 REFERENCE STANDARDS

A. ASTM D 5092 - Practice for Design and Installation of Groundwater Monitoring Wells.

B. Code of Federal Regulation (CFR), Title 40, Section 261.24 - Protection of the Environment.

C. CFR, Title 29, Section 1910.120 - Occupational Safety and Health Administration, Department of Labor.

D. CFR, Title 29, Section 1926 - Occupational Safety and Health Administration, Department of Labor.

E. CFR, Title 40, Section 261, Appendix II - Protection of the Environment.

F. Texas Administrative Code (TAC), Title 30, Chapter 335 - Industrial Solid Waste and Municipal Hazardous Waste.

G. TAC, Title 30, Chapter 334 - Underground and Aboveground Storage Tanks.

H. TAC, Title 30, Chapter 106.533 - Exemptions from Permitting, Subchapter X. Waste Processes and Remediation.

I. U.S. Environmental Protection Agency (EPA), (SW-846) Test Methods for Evaluating Solid Waste, Office of Solid Waste and Emergency Response, Washington, D.C. (P1388-239223, November 1986).

1.04 DEFINITIONS

A. Petroleum: Crude oil, natural gas, natural gas liquids, liquefied natural gas, and synthetic gas usable for fuel, as well as distillates of crude oil including gasoline, kerosene, diesel oil, motor oil, waste oil, jet fuels, and fuel oil.

B. Potentially Petroleum Contaminated Area (PPCA): An area within station-to-station locations identified on Drawings where petroleum contamination(1) has been detected in the soil or groundwater. PPCA also includes areas where contamination is suspected or encountered during utility installation outside areas identified on Drawings, and such contamination has been verified by Project Manager.

C. Category I Soil: Soil containing visual or physical evidence of contamination, as described in paragraph 3.01, and that is not Category II Soil.

D. Category II Soil: Soil that contains petroleum contamination in excess of levels identified in paragraph 3.04, or soil that contains visible free product or is impacted with non-petroleum compounds detected above Risk Reduction Standard Number 2 levels as defined in Texas Administrative Code, Title 30, Chapter 335.

E. Potentially Contaminated Groundwater: Water recovered in a groundwater control system located in PPCA or groundwater that contains visual or physical evidence of contamination, as described in paragraph 3.01, and such contamination has been verified by Project Manager.

1.05 SUBMITTALS

A. Conform to requirements of Section 01330 - Submittal Procedures.

B Submit an Environmental Work Plan within 30 days after issuance of Notice to Proceed.

1. The Environmental Work Plan shall be prepared by a Corrective Action Project Manager licensed in Texas, who has completed 40-hours of Health and Safety Training and the required annual refresher training, and in the employment of a registered Corrective Action Specialist firm.

2. The Environmental Work Plan shall include the following items. Compile and arrange in a format that can be reviewed by TCEQ.

a. Proposed sequence of construction through PPCA;

b. Procedures for screening soil in PPCA, identifying Category I or II Soil;

(1) Petroleum Products or Hazardous Substances.

c. Procedures for handling material from PPCA;

d. Proposed location of stockpile areas;

e. Proposed reuse of Category I Soil as trench backfill below depths of 30 inches;

f. Proposed methods for disposal or recycling of Category I or II Soil;

g. Proposed carriers of Category I or II Soil or potentially contaminated groundwater with verification each is properly licensed;

h. Proposed recycle/disposal sites for Category I or II Soil or potentially contaminated groundwater with verification that each is properly licensed;

i. Copy of permit required for discharge of potentially contaminated groundwater in sanitary sewer system, if to be disposed in sanitary sewer;

j. Name and qualifications of Corrective Action Project Manager and professional environmental consultants for health, environmental, and safety issues regarding operations within PPCA; and,

k. Proposed analytical laboratory with verification it is accredited by A2LA or other recognized association, or it is a participant in the EPAs Performance Evaluation Program.

3. Do not commence work in PPCA until Environmental Work Plan has been reviewed and accepted by Project Manager.

C. Submit Environmental Health and Safety Plan within 30 days after issuance of Notice to Proceed.

1. The Health and Safety Plan shall be prepared by a Corrective Action Project Manager licensed in Texas, who has completed 40 hours of health and safety training, and required annual refresher training, or a Certified Industrial Hygienist.

2. Include methods and procedures for assuring work, which will be conducted under conditions expected in the field, is safe.

D. As work proceeds, submit field screening, monitoring and analytical laboratory test results on a weekly basis for soil and on a daily basis for groundwater. Summarize test results in tables together with applicable regulatory criteria.

E. Submit copies of correspondence, reports, permits and other documents provided to, or received from, regulatory agencies.

1.06 PERSONNEL REQUIREMENTS

A. Provide trained personnel who have completed minimum health and safety programs specified by the Occupational Safety and Health Administration in 29 CFR 1910.120. Before beginning work at the site, each employee that will work in PPCA is required to have completed 40 hours health and safety training and the required annual refresher training.

PART 2 P R O D U C T S

2.01 MATERIALS

A. Do not use polyvinyl chloride or other plastic material, unless approved by Project Manager.

B. Water Line Pipe Material.

1. Furnish ductile-iron pipe or steel pipe material within station-to-station locations identified as PPCA on Drawings.

2. Provide restrained joints for ductile-iron pipe or welded joints for steel pipe.

3. Provide pipe material conforming to Standard Construction Specifications Section 02501 – Ductile Iron Pipe and Fittings or Standard Construction Specifications Section 02502 - Steel Pipe and Fittings.

C. Sanitary Sewer Pipe Material.

1. Furnish ductile iron pipe, centrifugally cast fiberglass pipe, or equivalent protective materials approved by Project Manager.

2. Provide restrained joints.

3. Provide pipe material conforming to Standard Construction Specifications Section 02501 – Ductile Iron Pipe and Fittings or Standard Construction Specifications Section 02504 - Centrifugally Cast Fiberglass Pipe. Use pipe with a minimum pressure rating of 150 psi.

D. Use Viton (FKM) type gaskets, or approved equal, for water lines and appurtenances requiring gaskets. Use Nitrile Rubber type gaskets, or approved

equal, for sanitary and storm sewer pipes, precast concrete manhole joints and appurtenances requiring gaskets.

PART 3 E X E C U T I O N

3.01 POTENTIALLY PETROLEUM CONTAMINATED AREAS

A. Conduct operations in PPCA in accordance with the accepted Environmental Work Plan and the Environmental Health and Safety Plan and to minimize the spread of contamination. In other areas which are either detected or suspected to be potentially petroleum contaminated areas, immediately notify Project Manager and proceed with work in accordance with this Section, unless otherwise directed by Project Manager.

B. Immediately notify Project Manager and TCEQ's Region 12 Field Office whenever Category I or II Soil or potentially contaminated groundwater are encountered.

1. Provide location, depth, type (soil or groundwater), source (if known), and evidence of suspected contamination.

2. Determine if Category I Soil or potentially contaminated groundwater is present by visual or physical evidence of contamination. Visual or physical evidence includes:

a. Petroleum or chemical odor.

b. Indication of levels of contamination by air monitoring devices employed as part of the Environmental Health and Safety Plan.

c. Soil or groundwater discoloration.

d. Material oozing/dripping into excavation.

e. Liquid or oily sheen floating on groundwater.

f. Buried containers or refuse.

g. Field screening 'head-space' results in excess of a 25 ppm reading on a Photoionization Detector (PID).

C. Install piping and gasket materials and appurtenances in conformance with appropriate section, except as modified in this Section.

D. Construct trench dams within a utility trench at each boundary of PPCA and laterals to minimize potential for contaminant transport within pipe bedding material. A trench dam shall consist of at least 24 inches of cement stabilized sand with 10 percent bentonite clay added, extending from 6 inches below bottom of trench to within 12 inches of limits of topsoil or pavement.

3.02 ENVIRONMENTAL MONITORING

A. An environmental consultant shall monitor conditions in PPCA, as specified in the Environmental Health and Safety Plan. Maintain safe working conditions in accordance with OSHA requirements (29 CFR 1926).

3.03 SCREENING PPCA SOILS

A. An environmental consultant shall perform field screening of soil removed from excavation or tunneling in PPCA.

B. Screening Procedures.

1. Place samples in a sealed plastic bag and place in a warm location for 15 minutes prior to screening.

2. Properly calibrate the PID using a calibration gas. Use 100 ppm isobutylene for calibration.

3. Open bag just enough to insert instrument probe and take maximum headspace reading.

4. Screen at least twice per hour while removing soils in open cut areas or shafts.

5. During tunneling, screen once for each pipe length in pipe jacked tunnels or each advance of tunnel shield in primary lined tunnels. Screen at least once per shift when excavating.

3.04 SAMPLING AND TESTING

A. Frequency.

1. Sample soil in PPCA at a rate of not less than one composite sample for every 20 cubic yards of excavation or volume corresponding to every 50 linear feet of installed underground utility, whichever is more frequent.

2. Sample water from PPCA to be discharged to a sanitary sewer one week prior to initiation of discharge, and at a rate of one grab sample once per day during discharge to sanitary sewer.

B. Analyze soil samples for parameters listed in Section 02120 – Off-Site Transportation and Disposal, Table 02120-1, Soil Criteria - Petroleum Only, and in accordance with SW-846. Handle as a Category II Soil if analytical results indicate any one, or more, parameters exceed allowable Maximum Concentration listed in Table 02120-1. If contaminants other than petroleum are suspected, immediately notify Project Manager who will determine the list of parameters to be analyzed. If such are encountered, compensation will be made under the Allowance for PPCA Handling.

C. Analyze groundwater samples for discharge to sanitary sewers. Analyze samples for BTEX by EPA Method 602, 8020, or 8021; TPH by EPA Method 418.1 or Method TX 1005; and Lower Explosive Limit (LEL) in accordance with EPA Method 1010.

D. Conduct analyses by proposed analytical testing laboratory listed in Environmental Work Plan.

3.05 AIR MONITORING REQUIREMENTS

A. Ensure health and safety of workers at the construction site. Maintain air quality within the construction zone to conform to exposure limits specified in Code of Federal Regulations (CFR) Title 29, Section 1910.120 enforceable by OSHA.

B. Provide adequate shoring and sufficient escape ladders in accordance with applicable trench safety regulatory requirements.

C. In the trench, continuously operate a combustible gas indicator (CGI) with LEL/O_2 meter to monitor vapor and oxygen levels. Properly calibrate CGI and provide an alarm that sounds if greater than or equal to 20 percent Lower Explosive Limit (LEL), less than or equal to 19.5 percent oxygen, or greater than or equal to 25 percent oxygen is reached. Record monitoring data from CGI every 15 minutes to ensure safe work conditions.

D. Take appropriate measures during construction to keep LEL levels below 20 percent in the trench. If vapor concentrations exceed 20 percent of LEL stop construction work, turn off equipment, and have workers immediately vacate the PPCA in an upwind direction.

E. Take readings with PID 50 feet downwind of area during excavation or work in contaminated excavation areas and until one hour after cessation of such work. Take readings within breathing zone at approximately 4 feet above ground level. Record readings, date, time, initials of person taking reading, PID serial number and last calibration date of PID in bound field book.

END OF SECTION

THE REMAINING PAGES SHOULD NOT BE INCLUDED IN THE CONTRACT DOCUMENTS BUT ARE INCLUDED FOR INSTRUCTIONAL PURPOSES ONLY.

THE FOLLOWING ITEMS SHOULD BE CHECKED FOR COORDINATION DURING DESIGN:

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A. This section is to be used only if a PPCA is identified on the Drawings and the contamination or suspected contamination is characterized in a Phase II Environmental Site Assessment (ESA) report referenced in the Bid Documents. This section applies to Class I non-hazardous petroleum contaminated soil that can be properly disposed in a landfill and petroleum contaminated water that can be disposed off-site or in a sanitary sewer or treated for such disposal.

   Other types of known contamination (including non-petroleum hydrocarbons and hazardous wastes) should be addressed in a separate specification. Obtain direction from Project Manager and Environmental Engineering Specialists.

B. Drawing/Specification Coordination

   1. Clearly identify PPCA along the alignment from station to station on the Drawings where petroleum contamination is indicated in the Phase II ESA. Use following labels on Drawings: Begin PPCA Excavation and End PPCA Excavation. PPCA along the alignment should begin and end at a clean boring. Use good engineering judgement where no contamination is identified along the utility alignment but where contamination adjacent to the right-of-way is known.

   2. Show existing environmental borings and well locations on the Drawings. Indicate boring and monitoring well designations. Use different symbols for borings (target) and monitoring wells (target in circle). Indicate direction of groundwater flow, if known.

   3. Show existing geotechnical boring and piezometer locations on the Drawings. Use different symbols for borings and piezometers.

   4. If possible, avoid constructing utilities in PPCA. If locating a utility in a PPCA is unavoidable, design and construct a shallow utility that minimizes the need for de-watering which may exacerbate the migration of contaminated liquids and the handling of contaminated material.

   5. Primary-lined, rib-and-lagging tunnel construction will not be allowed in PPCA.

6. Within limits of Drawings, indicate location of Leaking Registered Storage Tank sites and show the following information in a note on the Drawings:

   Present Owner of Tank
   (Owner of Tank when contamination initially disclosed, i.e., Potentially Responsible Party, if different from Present Owner and designated by TCEQ records)
   Street Address
   Leaking Petroleum Storage Tank Identification Number (Texas LPST ID Number)

7. Within limits of Drawings, indicate location of other sites of known contamination and show the following information in a note on the Drawings:

   Present Owner of Facility
   Street Address
   Facility Type
   Contaminate(s)
   Affected Media (i.e.; soil, groundwater, other)

C. Document 01110 - Summary of Work should include a short paragraph describing the environmental contamination expected, including a summary of the type, level, and location of contamination, a reference to the ESA reports, and noting Section 02105 - Chemical Sampling and Analysis and 02120 – Off-Site Transportation and Disposal.

D. Document 00320 - Geotechnical Information should reference the ESA reports.

E. Verify pipe specifications, including pipe coatings, linings, and gaskets to require special materials that are resistant to the levels of contaminants identified in the Phase II ESA for application in PPCA, especially where free product is found near the elevation of the proposed utility, as recommended by manufacturers.

F. Whenever this section is used, additional required insurance coverages must be included. Refer to Article 11 of Document 00800 - Supplementary Conditions.

G. The following provides direction for the development and delineation of pay items associated with petroleum contamination.

   1. Preparatory Work (paragraph 1.02A). A minimum acceptable price should be derived by the Design Consultant and shown on Document 00410 – Bid Form, with a line above to allow the Contractor to cross out the minimum price and provide a higher bid if he so desires. Use the following schedule as a guideline, with site-specific adjustments, as necessary, to determine the appropriate minimum lump sum bid:

SCHEDULE OF MINIMUM PRICE - PREPARATORY WORK

Item	Minimum
Hiring environmental consultants [a]	$2000/month
Preparation of Environmental Health & Safety Plan [b,c]	$2000
Training of personnel [d]	$2000
Obtaining permits [e]	$300
Obtaining additional insurance	$2000

Notes:

[a] Primarily dependent on number of people required. Minimum price assumes one person 25 percent of the time for a one-month duration.

[b] Primarily dependent on level of contamination expected and resultant special requirements.

[c] Minimum price assumes 1 week to prepare.

[d] Primarily dependent on level of contamination and type of construction (i.e., trench or tunnel). Minimum price assumes 8 hours of training for 2 people, including training course, labor hours, and minimal expenses.

[e] Minimum price based on time for applications to discharge to sanitary sewer or for air emissions.

2. **Underground Utility Construction in PPCA** (paragraph 1.02B). Those bid items normally paid separately by City of Houston, that are anticipated within limits defined as PPCA, need to have a separate Bid Item in Document 00410 – Bid Form. These Bid Items need to be designated as in PPCA. For example, 8 inch Water Main in Augered Hole, in PPCA.

3. Extra Work for PPCA Handling. This item provides funds for immediate response and continuation of the Work when an unexpected or additional contamination problem develops which is not covered by existing pay items. An amount of $50,000 per contamination location is recommended, up to a maximum of $150,000 for a project.

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END OF NOTES